EPA Region 7 TMDL Review

TMDL ID:	KS-UR-01-W088-1	**Waterbody ID:**	KS-UR-01-W088_1
Waterbody Name:	ARIKAREE RIVER		
Tributary:	ARIKAREE RIVER		
Pollutant:	FLUORIDE		
State:	KS	**HUC:**	10250001
BASIN:			
Submittal Date:	6/30/2006		
Approved:	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Letter, dated June 30, 2006, and received by EPA on June 30, 2006, formally submitted this TMDL for approval under Section 303(d). A revised version was submitted by email on August 29, 2006.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

Most of the watershed is located in Colorado, cutting a corner in Kansas. In Kansas, violations of the criteria occur more frequently during greater than average flow events during all three defined seasons, Winter: November-March, Spring: April-July, Summer-Fall: August-October (Table 1). The current Kansas criterion of 1 mg/L of fluoride was used to establish a load duration curve.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

1 mg/L for Agricultural Water Supply (Irrigation) Use, 2 mg/L for Livestock and Domestic Water Supply (KAR 28-16-28e(c)(l)). This segment is designated for the following in Kansas: Special Aquatic Life Support, Primary Contact Recreation (C), Domestic Water Supply; Food Procurement; Ground Water Recharge; Industrial Water Supply Use; Irrigation Use; Livestock Watering Use.

Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

Kansas Implementation Procedures for Surface Water allow for a background to be established when the monitoring record indicates that the existing criteria is unachievable due to naturally occurring conditions. The specific stream criteria to supplant the existing criteria will be developed concurrent with Stage One of this TMDL following the appropriate administrative and technical Water Quality Standards processes for Site 226 based on currently available information and will be 1.25 mg/L (reflecting the averages during the winter greater than median flow) from data collected over 1986-2005 (Figure 5). Future TMDL assessment will be based on this proposed background criteria.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

Based upon observations provided by the Kansas Geological Survey, the source of the dissolved fluoride in the river water is likely water from the Ogallala-High Plains aquifer discharged to the river either from elevated groundwater levels, baseflow contributions after runoff events, or return flows from irrigated lands. Significant irrigation activity associated with corn production occurs in the Arikaree basin in Colorado. Irrigation water is drawn from deepwater wells that tap the High Plains Aquifer. There are no point sources or confined animal feeding operations in the Kansas portion and one city on the Colorado side.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

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WLA Comment

WLA is set at zero because there are no facilities in Kansas. The facility in Colorado, Genoa, CO. had a US Census figures 211 people in 2000. Although not specifically discussed in the TMDL, any further reductions in Floride outflow for that source would have negligible impact on the TMDL targets.

LA Comment

The majority of the fluoride load in the Arikaree River appears to be background in nature. At site 226 the Load Allocation based on the existing fluoride criteria of 1.0 mg/L across all flow conditions is shown in Figure 4, and is 20 pounds per day of fluoride at the median flow of 3.7 cfs. The LA at station 226 will increase if the elevated background concentration (1.25 mg/L) becomes the applicable criteria (25 lbs/day at median flow of 3.7 cfs)

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The Margin of Safety provides some hedge against the uncertainty of loading and the fluoride endpoints for the Arikaree River system. Since there are no point sources discharging to the Arikaree River and it appears much of the water monitored at Site 227 arises from Colorado and Nebraska, the Margin of Safety will be implicit based on the conservative assumption that implementation of control practices on activities in Kansas will reduce non-point source contributions sufficiently to restore water quality and designated uses on the Kansas portion of the Arikaree River.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal fluoride concentration is a function of flow. Generally, concentrations are greatest at moderate flows during the winter and spring. The highest flows show a possible dilution effect. Spring and winter flows, the non-irrigation season, show similar patterns, with lower concentrations at the lowest flows, peaking at 4-6 cfs, and then declining with increasing flow.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public meetings to discuss TMDLs in the Upper Republican Basin were held March 2, 2006 in Atwood. An active Internet Web site was established at http://www.kdheks.gov/tmdl/index.htm to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Upper Republican Basin. Public Hearings on the TMDLs of the Upper Republican Basin were held in Atwood on March 2, 2006.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

KDHE will continue to collect bimonthly samples at Station 226, including fluoride samples, in each of the three defined seasons. Based on that sampling, the stream will be evaluated in 2011 with application of numeric criterion based on background concentrations.

Reasonable assurance

Reasonable assurance only applies when reductions in nonpoint source loading is required to meet the prescribed waste load allocations.

This is a non-point source only TMDL. The one facility in Colorado in not expected to be measurably contributing to the impairment.